DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ARITHMETIC.

120. Proposed by ELMER SCHUYLER, B. Sc., Professor of German and Mathematics in Boys' High School, Reading, Pa.

How many balls 1 inch in diameter can be put in a cubical box 1 foot in the *clear* each way, putting in the maximum number? [From Greenleaf's *Treatise on Algebra.*]

III. Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Science and Mathematics, Chester High School, Chester, Pa., and H. C. WHITAKER, Ph. D., Professor of Mathematics, Manual Training School, Philadelphia, Pa.

The maximum number of balls is not 2149, as given Vol. VII, No. 3, but 2151, as demonstrated below.

Put in 4 rows of 12 balls. Then in the space 8×12 can be put 9 more rows of 12 and 11 alternately; for $8\times\frac{1}{2}\sqrt{3}+1=7.928$.

$8-7.928=.072$ of an inch to spare.

This gives in the first layer 9 rows of 12 each $=108$, and 4 rows of 11 each $=44$. $\therefore$ 152 in all.

In the other space $12\times12\times11$ we can put as before eight layers of 144 each and 7 layers of 121 each.

$\therefore$ Eight layers of $144=1152$
Seven layers of $121=847$
One layer of $152=152$

Total$=2151$

125. Proposed by F. M. PRIEST, Mona House, St. Louis, Mo.

A Quaker once, we understand
For his three sons laid off his land,
And made three equal circles meet
So as to bound an acre neat.
Now in the center of the acre,
Was found the dwelling of the Quaker;
In centers of the circles round,
A dwelling for each son was found.
Now can you tell by skill or art
How many rods they live apart?

I. Solution by M. A. GRUBER, A. M., War Department, Washington, D. C.

The centers of the circles three
With straight lines let united be;
Where touch the arcs, respectively,
These lines will cross the tangency.
Just twice the radius is each line,
And they in trigon space confine
Each circle's sixth and "acre neat,"
No more nor less. With pencil fleet,
From trigon's several vertices
To circles' opposite tangencies,
Respectively, three uprights trace,